

III. "Observations on the Respiratory Movements of Insects."

By the late WILLIAM FREDERICK BARLOW, F.R.C.S.

Arranged and communicated by JAMES PAGET, F.R.S.

Received August 20, 1854.

This essay contains the greater part of a series of observations made between 1845 and 1850. The following are some of the conclusions which they plainly indicate :—

(1.) The respiratory movements of Dragon-flies (*Libellulæ*), and, probably, of other insects also, are naturally subject to considerable and frequent variations in force and rate, the causes of many of these variations being as yet unknown.

(2.) The respirations of these insects are always quickened by exercise, emotion, rise of temperature, galvanism, and mechanical irritation; and the last three agents quicken them in the decapitated, as well as in the perfect, insect.

(3.) The respiratory movements of each segment of the trunk are, in some measure, independent of those of the rest, although in the perfect insect they concur in all the segments. They continue to be performed, though feebly and slowly, in separated segments, provided their nervous cords and ganglia are entire: and they may be abolished in single and successive segments by the local action of chloroform.

(4.) The removal of the head, including the supra- and sub-œsophageal ganglia, does not, like the removal of the medulla oblongata of the vertebrate animal, put a stop to the respiratory movements of the insect; but it diminishes their frequency and force, and deprives them of all influence of the will and of mental emotions.

(5.) The shock inflicted by the sudden destruction of the head, or of the terminal part of the abdomen, generally stops all the respiratory movements of the insect for a time, and much enfeebles them during the remainder of its life.

(6.) The general tendency of the observations is to corroborate the opinion of the self-sufficiency of the several ganglia for the movements of their appropriate segments, and, thus far, to maintain the belief in their essential independence. At the same time, the ob-

servations on the diffused influence of shocks accord with those of the coordinate similar movements of all the segments, in proving their close mutual relations and mutual influence.

November 23, 1854.

THOMAS BELL, Esq., V.P., in the Chair.

W. C. Williamson, Esq., was admitted into the Society, in accordance with the Statutes.

The Chairman gave notice of the ensuing Anniversary Meeting, and read the names of the noblemen and gentlemen proposed as Council and Officers for the ensuing year.

The following gentlemen were elected Auditors of the Treasurer's Accounts on the part of the Society :—

Sir B. Brodie, Bart., C. Darwin, Esq., Dr. Hofmann, James Paget, Esq., and Robert Stephenson, Esq.

The following communications were read :—

I. "On the Impregnation of the Ovum in the Stickleback."

By W. H. RANSOM, M.D. Communicated by Dr. SHARPEY,
Sec. R.S. Received October 20, 1854.

I purpose placing before the Royal Society in this communication, the principal results of experiments made during the months of June and July last, on the impregnation of the ovum in *Gasterosteus leiurus* and *G. pungitius*, and hope to be able to furnish a more detailed account of my observations on a future occasion.

The ovarian ovum of these fishes, at a very early stage of its development, is provided with a proper investing membrane, the future chorion. At a later period, one portion of this membrane presents a number of cup-shaped pediculated bodies scattered over its surface, and in the centre of this part of the chorion there is a